STOCKPILE REPORT
to the Congress

JANUARY - JUNE 1960

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF CIVIL AND DEFENSE MOBILIZATION
WASHINGTON 25, D.C.

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OFFICE OF THE DIRECTOR

October 1960

The Honorable
The President of the Senate

The Honorable
The Speaker of the House of Representatives

Sirs:

There is presented herewith the semiannual report to the Congress on the strategic and critical materials stockpiling program for the period January 1 to June 30, 1960. A classified statistical supplement to this report is being transmitted to you under separate cover.

This report is submitted pursuant to Section 4 of the Strategic and Critical Materials Stock Piling Act, Public Law 520, 79th Congress.

Sincerely,

Leo A. Hoegh

Contents

Summary

This report covers principal activities in stockpile planning and operations for the period January 1 through June 30, 1960, under the provisions of Public Law 520 (79th Congress), The Strategic and Critical Materials Stock Piling Act.

Strategic stockpile inventories for the 76 materials on the stockpile list as of June 30 approximately equaled or exceeded maximum objectives for 53 materials and basic objectives for 64 materials. Additional quantities in other Government inventories, if added to the strategic stockpile, would change these totals to 61 maximum objectives and 71 basic objectives. Quantities on order would complete 2 additional basic objectives and 3 additional maximum objectives.

The total strategic stockpile inventory of specification-grade Group I materials was valued at $6.0 billion on the basis of June 30, 1960, market prices; $4.3 billion of this amount was applicable to the maximum objectives, which were valued at $4.7 billion, and $1.7 billion represented excess inventories for some of the Group I materials acquired under previously higher objectives.

Commitments made during the six months' period for open-market purchases totaled $459,000. This relatively small amount is the consequence of stepping up efforts to obtain by barter or by payment in kind the materials needed against strategic stockpile objectives.

Materials valued at approximately $7.2 million were delivered to the strategic stockpile, as a result of previous commitments. Of this amount, $3.7 million was applicable to strategic stockpile objectives in effect as of June 30. Materials on order at the end of the period were valued at $5.9 million, with $1.8 million applicable to stockpile objectives.

Reduction of commitments between January and June, for deliveries of materials to the strategic stockpile and DPA inventories in excess of maximum objectives, reduced Government cash obligations by approximately $24 million, bringing total reductions since 1958 to more than $374 million.

Sales commitments for disposal of excess materials from the strategic stockpile and DPA inventories for the six months' period totaled $77.3 million, with $67.7 million of this representing disposals from the strategic stockpile. Included in the total figure were commitments for sale of materials to Government agencies for direct use, as well as rotation sales without replacement of deteriorative materials in excess of the maximum objectives.

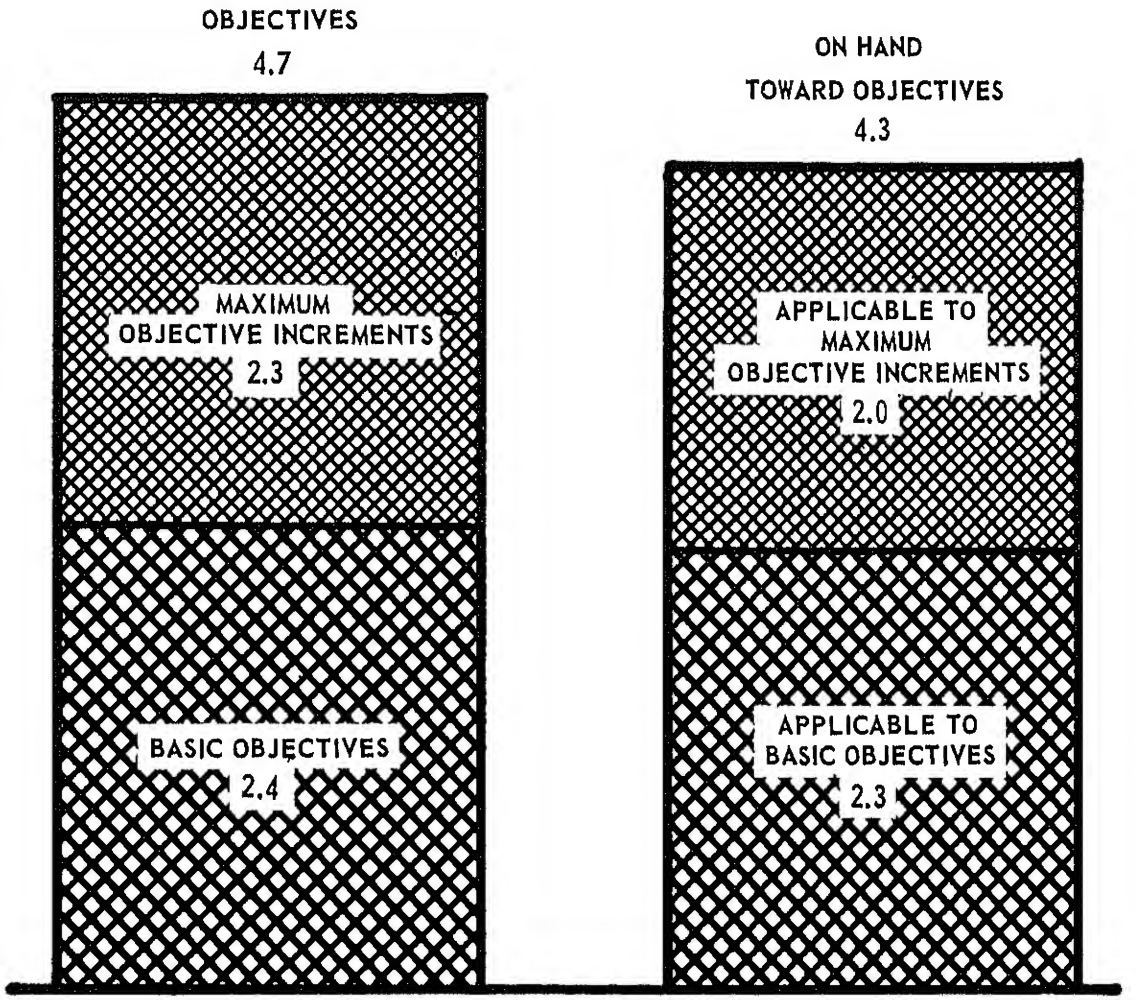
Studies of emergency supply and requirements estimates led to the restoration of one material, rutile, to Group I of the List of Strategic and Critical Materials for Stockpiling.

CHART 1

STOCKPILE OBJECTIVES AND APPLICABLE STRATEGIC STOCKPILE INVENTORIES

AS OF JUNE 30, 1960

(IN BILLIONS OF DOLLARS, BASED ON JUNE 30, 1960, MARKET PRICES)



Quantities in excess of certain maximum objectives, valued at $1.7 billion, and outstanding commitments of 5.9 million are not included.

Status of Strategic Stockpile Inventories

ACHIEVEMENT OF STOCKPILE OBJECTIVES

On June 30, 1960, as shown by Table A, strategic stockpile inventories for the Group I materials (those for which there are official stockpile objectives) equaled or exceeded the maximum objectives for 53 materials and the basic objectives for 64 materials. Total dollar values of the objectives and applicable inventories are shown in Chart 1.

Quantities of materials in other Government-owned inventories, if transferred to the strategic stockpile, would increase to 61 the number of maximum objectives and to 71 the number of basic objectives met by total quantities on hand in Government inventories as of June 30. Quantities on order would complete 2 additional basic objectives and 3 additional maximum objectives.

Total specification-grade inventories of Group I materials in the strategic stockpile, amounting to approximately 26 million tons, were valued at $6.0 billion on the basis of June 30 market prices, compared with a December 31, 1959, market valuation of $6.1 billion and an acquisition cost of $5.8 billion. Of the aforementioned inventories, $2.3 billion was applicable to the basic objectives which are valued at $2.4 billion, and $2.0 billion was applicable to the maximum objective increments which are valued at $2.3 billion. Excess specification-grade inventories for some of the Group I materials, representing quantities acquired against previously higher objectives, are now valued at $1.7 billion as against $1.8 billion last shown.

Total outstanding commitments for the strategic stockpile amounted to approximately $5.9 million, with $4.1 million of this in excess of the maximum objectives in effect on June 30. Most of the excess is expected deliveries under foreign aid programs, contracted for against stockpile objectives that have now been reduced.

TABLE A

Group I of the List of Strategic and Critical Materials for Stockpiling

The following list, which constitutes Group I of the materials in the strategic stockpile, identifies the materials for which inventories approximately equaled or exceeded objectives in effect as of June 30, 1960.

Group I materials are acquired by purchase and by transfer of Government-owned surpluses pursuant to Sections 3 (a) and 6 (a) of the Strategic and Critical Materials Stock Piling Act (Public Law 520, 79th Congress). This list, which shows

Materials	Strategic stockpile inventory equals or exceeds	
	Basic objective	Maximum objective
1. Aluminum	x	(1)
2. Aluminum Oxide, Fused, Crude	x	x
3. Antimony	x	
4. Asbestos, Amosite	(2)	
5. Asbestos, Chrysotile		
6. Asbestos, Crocidolite (Soft)*	x	x
7. Bauxite, Metal Grade, Jamaica Type	(1)	(1)
8. Bauxite, Metal Grade, Surinam Type	x	(2)
9. Bauxite, Refractory Grade	x	x
10. Beryl	x	x
11. Bismuth	(1)	
12. Cadmium	x	x
13. Castor Oil	x	x
14. Celestite		
15. Chromite, Chemical Grade	x	x
16. Chromite, Metallurgical Grade	x	x
17. Chromite, Refractory Grade	x	
18. Cobalt	x	x
19. Columbium	x	(3) x
20. Copper	x	(3) x
21. Cordage Fibers, Abaca	x	x
22. Cordage Fibers, Sisal	x	x
23. Corundum	x	x
24. Diamond Dies, Small		
25. Diamond, Industrial: Crushing Bort	x	x
26. Diamond, Industrial: Stones	x	(1)
27. Feathers and Down, Waterfowl	x	x
28. Fluorspar, Acid Grade	x	x
29. Fluorspar, Metallurgical Grade	x	x
30. Graphite, Natural--Ceylon, Amorphous	x	x
31. Graphite, Natural--Madagascar, Crystalline	x	x
32. Graphite, Natural--Other Than Ceylon and Madagascar, Crystalline	x	x
33. Hyoscine	x	x
34. Iodine	x	
35. Jewel Bearings		
36. Kyanite-Mullite	x	x
37. Lead	x	x
38. Magnesium	x	x
39. Manganese, Battery Grade, Natural Ore	x	x
40. Manganese, Battery Grade, Synthetic Dioxide	x	x

Materials	Strategic stockpile inventory equals or exceeds	
	Basic objective	Maximum objective
41. Manganese, Chemical Grade, Type A Ore.....	x	x
42. Manganese, Chemical Grade, Type B Ore.....	(1)	(2)
43. Manganese, Metallurgical Grade.....	x	(1)
44. Mercury.....	x	x
45. Mica, Muscovite Block, Stained A/B and Better	x	(1)
46. Mica, Muscovite Film, First and Second Qualities.....	x	(1)
47. Mica, Muscovite Splittings.....	x	x
48. Mica, Phlogopite Splittings.....	x	x
49. Molybdenum.....	x	(3) x
50. Nickel.....	x	x
51. Opium.....	x	x
52. Platinum Group Metals, *Iridium*.....	x	x
53. Platinum Group Metals, Palladium.....	(1)	(1)
54. Platinum Group Metals, Platinum.....	x	x
55. Pyrethrum.....	x	x
56. Quartz Crystals.....	x	x
57. Quinidine.....	x	x
58. Rare Earths.....	x	x
59. Rubber, Crude Natural...	x	x
60. Rutile.....	x	
61. Sapphire and Ruby.....	x	x
62. Selenium.....	(1)	
63. Shellac.....	x	
64. Silicon Carbide, Crude..	(1)	(1)
65. Silk Noils.....	x	x
66. Silk, Raw.....	(2)	(2)
67. Sperm Oil.....	x	x
68. Talc, Steatite, Block and Lump.....	x	x
69. Tantalum.....	x	(3) x
70. Tin.....	x	x
71. Tungsten.....	x	(3) x
72. Vanadium.....	x	(3) x
73. Vegetable Tannin Extract, Chestnut.....	x	x
74. Vegetable Tannin Extract, Quebracho.....	x	x
75. Vegetable Tannin Extract, Wattle.....	x	x
76. Zinc.....	x	x

[1]Sufficient quantities are on hand in total Government-owned inventories to complete the objective.

[2]Total quantities on hand in and on order for all Government-owned inventories are sufficient to complete the objective.

[3]Although total quantities are equal to the maximum objective, the upgrading program has not been completed.

Crocidolite (Soft) was removed from the list after June 30, 1960.

achievement of objectives only if the material is actually in the strategic stockpile inventory, is subject to change as inventories increase and as stockpile programs are revised.

Many of the materials also are being acquired through the barter of surplus agricultural commodities under the provisions of the Agricultural Trade Development and Assistance Act of 1954 (Public Law 480, 83rd Congress) as amended and other basic legislation for the Department of Agriculture. Mainly, these materials are transferred to the supplemental stockpile. Several of the Group I materials have been acquired under the Defense Production Act (Public Law 774, 81st Congress) as amended, for Government use or resale, as a part of the defense program for expansion of productive capacity.

So long as materials of stockpile specification grade remain in government inventories other than the strategic stockpile inventory, it is considered that they would be available in the event of an emergency and therefore they are taken into account in planning procurement against the basic and maximum strategic stockpile objectives. Accordingly, by footnotes as appropriate, it is shown when total Government inventories are adequate to complete the objectives.

Also footnoted are those materials for which upgrading objectives in effect as of June 30 have not been achieved.

TABLE B

Group II of the List of Strategic and Critical Materials for Stockpiling

The following list constitutes Group II of the List of Strategic and Critical Materials for Stockpiling, as of June 30, 1960. These materials are kept under surveillance, without stockpile objectives; should it become necessary to establish stockpile objectives against a potential deficit in supply, they will be transferred to the Group I list. Quantities that are in the strategic stockpile were acquired many years ago principally by the transfer of Government-owned surpluses pursuant to Section 6 (a) of Public Law 520, 79th Congress.

1. Mica, Muscovite Block, Stained B and Lower*
2. Mica, Phlogopite Block**
3. Wool*

*Removed from the stockpile list after June 30, 1960.

**Study under way to determine need for stockpiling this material.

OTHER MATERIALS IN STRATEGIC STOCKPILE INVENTORY

In addition to inventories of specification-grade Group I materials, the strategic stockpile contains (1) nonspecification grades of the Group I materials

and (2) various materials, such as the Group II materials, materials that have been removed from the stockpile list and others, for which there are no objectives. Quantities of these materials on hand as of June 30 are shown in Tables C and D. Sales commitments for some of these are shown under "Notes on Strategic and Critical Materials."

Most of the nonspecification-grade stocks were acquired by transfer of Government-owned surplus materials. Some of these were taken under stockpile specifications now outmoded for such reasons as changes in industry practice and technological advances; others were taken with a view to processing them to specification grade if this were necessary in order to meet emergency demands. Disposal action for some of these items has been authorized by OCDM. Changes since the last report are due principally to disposals, redesignations of stockpile unit of measure, reclassifications in stockpile grades and processing of the material under the program for upgrading to higher-use forms.

TABLE C

Strategic Stockpile Inventories of Nonspecification Grades of Materials for Which There Are Stockpile Objectives

As of June 30, 1960

Material	Unit	Quantity
Aluminum	ST	1,787
Bauxite, Metal Grade, Surinam Type	LDT	24
Bismuth	Lb.	36,580
Cadmium	Lb.	1,764,427
Celestite	SDT	12,171
Chromite, Metallurgical Grade	SDT	404
Columbite	Lb.	1,362,318
Diamond Dies, Small	Pc	8,375
Fluorspar, Acid Grade	SDT	4,960
Graphite, Madagascar--Crystalline Fines	ST	1,054
Jewel Bearings	Pc	14,715,973
Magnesium	ST	6,213
Manganese, Metallurgical Grade	SDT	484,013
Mica, Muscovite Block, Stained A/B and Better	Lb.	348,543
Mica, Muscovite Film, 1st and 2d Qualities	Lb.	23,674
Nickel	Lb.	2,345,937
Opium	Lb.	2,180
Platinum Group Metals, Platinum	TrOz	4,930
Quartz Crystals	Lb.	940,181
Talc, Steatite Block	ST	42
Tantalite	Lb.	1,857,394
Tungsten	Lb.	15,329,377
Vanadium	Lb.	475,737

Source of data: General Services Administration.

TABLE D

Strategic Stockpile Inventories of Materials for Which There are No Stockpile Objectives

As of June 30, 1960

Material	Unit	Quantity
Agar	Lb.	95,681
Bristles, Hog	Lb.	643,777
Coconut Oil	Lb.	242,435,450
Cotton, Extra Long Staple	Bale	219,581
Diamond Dies, Other Than Small	Pc	355
Diamonds, Cuttables and Gems	Kt.	47,049
Diamonds, Tools	Pc.	64,197
Guayule Seeds	Lb.	17,426
Mica, Muscovite Block, Stained B and Lower	Lb.	4,633,543
Mica, Muscovite Film, 3d Quality	Lb.	493,736
Mica, Phlogopite Block	Lb.	223,126
Palm Oil	Lb.	38,582,764
Platinum Group Metals, Osmium	TrOz	27
Platinum Group Metals, Rhodium	TrOz	3,326
Platinum Group Metals, Ruthenium	TrOz	51
Poppy Seeds, Opium	Lb.	51,646
Quartz, Processed	Pc	7,622,304
Quinine	Oz	11,988,562
Quinine, Hydrochloride of	Oz	1,872,468
Silk Waste	Lb.	2,782,291
Talc, Steatite, Ground	ST	6,285
Totaquine	Oz	7,820,400
Zirconium Ore, Baddeleyite	SDT	16,533
Zirconium Ore, Zircon	SDT	15,398

Source of data: General Services Administration.

Activities for the Period January-June 1960

STOCKPILE REVIEWS

During the period January through June, the Office of Civil and Defense Mobilization continued its materials supply-requirements studies with the cooperation and assistance of the delegate agencies. As a result of these studies, the following actions were taken during the six months' period: 4 basic and 7 maximum objectives were increased, 5 basic and 2 maximum objectives were decreased; objectives were established for one material, rutile, that was transferred from Group II to Group I of the List of Strategic and Critical Materials for Stockpiling. The subobjectives for minimum readiness inventories of advanced forms of 2 stockpile materials were reviewed; 2 subobjectives were increased and 1 was reaffirmed. Reviews of emergency supply and requirements for several other materials, including upgrading needs, were almost completed at the end of the reporting period.

PROCUREMENT

Efforts have been made in all stockpile procurement, including upgrading, to obtain the necessary materials under the barter program and by payment in kind. For example, authority for cash procurement of tungsten carbide powder was canceled in favor of an attempt to obtain the material by barter provided the processing could be done domestically. Arrangements were made in the upgrading of stockpiled molybdenum sulphide to molybdic oxide to pay the cost of upgrading with surplus copper from the DPA inventory.

Of the other three materials in the strategic stockpile procurement directive for FY 1960, contracts were let for chrysotile asbestos and jewel bearings, but the authorization for small diamond dies was finally withdrawn pending evaluation of the performance of domestic suppliers under earlier contracts. Most of the diamond die producers have had difficulty in manufacturing dies that will meet stockpile specifications. One-year extensions on delivery have been granted to give them additional time to try to resolve their production problems.

Total commitments and deliveries for the strategic stockpile for the period January to June are shown by dollar value in Table E.

PURCHASE SPECIFICATIONS AND SPECIAL INSTRUCTIONS

During the period January-June, the Office of Civil and Defense Mobilization issued seven revised purchase specifications. (See Appendix B) In addition, three revised special instructions and one new one were issued to the General Services Administration, giving guidance on the stockpiling of strategic materials.

TABLE E

Commitments and Deliveries for the Strategic Stockpile, January-June 1960
Valued at June 30, 1960, Market Prices

(Thousands of dollars)

Source of stockpile materials	Toward basic objectives		Additional toward maximum objective increments		Total applicable to objectives	
	Commitments	Deliveries	Commitments	Deliveries	Commitments	Deliveries[2]
Open market	459	308	0	713	459	1,021
DPA inventories	0	0	0	0	0	0
CCC inventories	0	0	0	0	0	0
Foreign aid programs[1]	0	0	0	2,515	0	2,515
Surplus declarations[1]	0	197	0	0	0	197
Total	459	505	0	3,228	459	3,733

[1]These materials are supplied without cost to the stockpile.

[2]Does not include quantities delivered, valued at approximately $3.5 million, that are in excess of the present stockpile objectives.

Source of data: General Services Administration.

Because of the difficulties of domestic contractors in manufacturing small diamond dies to meet stockpile specifications, the specifications for this material were reexamined. It was determined that accelerating miniaturization in electronic equipment for strategic purposes does not permit relaxation of the exacting standards for the finished dies.

Specifications for tantalum metal for the stockpile have been under study for some time. The principal delay in development of satisfactory specifications is one of devising testing procedures that will assure satisfactory performance of the metal for use in capacitors.

REDUCTION OF COMMITMENTS

Efforts were continued in the interest of reducing commitments for delivery to the strategic stockpile and DPA inventories, of materials that would be surplus to the maximum stockpile objectives. Government obligations were thus reduced, during the six months' period ending June 30, by $9.7 million for the strategic stockpile and by $14.6 million for the DPA inventory, for a total six months' reduction of $24.3 million. Of this total amount, $6.0 million represented conversion to barter of DPA contracts for mica and rutile, and of strategic stockpile contracts for mica and industrial diamond bort.

Reductions in cash commitments for the fiscal year 1960 totaled $12,258,000 for the strategic stockpile and $63,298,000 for the DPA inventory.

Total reductions for both inventories, 1958 to June 30, 1960, amounted to $374,056,000, with $57,871,000 of this for strategic stockpile commitments and $316,185,000 for DPA commitments. Commodities involved in the contract reductions since 1958 are:

Aluminum	Manganese
Chromite	Mica
Cobalt	Molybdenum
Copper	Nickel
Diamond, Industrial Bort	Rutile
Fluorspar	Titanium
Lead	Tungsten

DISPOSAL PROGRAMS

Actual disposal, commitments for disposal or publication of the intent to dispose of the following materials from the strategic stockpile and DPA inventories, took place within the six months' reporting period: agar, alumina, hog bristles, cadmium-magnesium scrap, metallurgical chromite, coconut oil, copper, the cordage fiber abaca, cryolite, gem diamonds, feathers and down, graphite, guayule seeds, hyoscine, kyanite-mullite, nickel, palm oil, platinum group metals, pyrethrum, rare earths, rubber, silk waste, talc, thorium, tin, titanium, zinc and zircon. These activities are summarized under the section, "Notes on Strategic and Critical Materials."

Under the provisions of Public Law 86-255, the "Independent Offices Appropriation Act, 1960," some of the excess quantities of deteriorative materials in the strategic stockpile were sold under the rotation provisions of the Stock Piling Act. The Appropriation Act, which expired June 30, provided that to the extent materials to be sold under the rotation section of the Stock Piling Act to prevent deterioration were excess to stockpile needs, the replacement provisions of that section were not mandatory.

During the January-June period, sales commitments for disposal of excesses of the rotation materials abaca, feathers and down, palm oil, rubber and silk waste, without replacement, amounted to $39.4 million. Other sales commitments for disposal of excess and obsolete materials from the strategic stockpile and DPA inventories totaled approximately $37.9 million. These included agar, alumina, hog bristles, coconut oil, copper, cryolite, gem diamonds, hyoscine, nickel, pyrethrum, tin, titanium sponge, zinc and zircon.

GSA continued its technical review of materials in the strategic stockpile and DPA inventories for the purpose of recommending to OCDM the disposal of materials not applicable to stockpile objectives for such reasons as deficiency in quality or surplus in quantity.

Government Utilization or Surplus Materials

Pursuant to Defense Mobilization Order V-7, revised December 10, 1959, Government agencies that directly use strategic and critical materials have been requested to fulfill their requirements through the use of excess Government inventories whenever such action is found to be consistent with overall disposal policies and with the best interests of the Government.

As of June 30, Government agency commitments for utilization of excess materials, such as copper, nickel and feathers and down, totaled approximately $7,000,000. Feathers and down will be released from the strategic stockpile and copper and nickel from the DPA inventory.

STOCKPILE STORAGE AND MAINTENANCE

Stockpile Security

The study of the probable post-attack availability of stockpiles, initiated in late 1959, is substantially completed. On the basis of this study interim policies have been issued, supported by damage probability tables, for GSA's use in evaluating the relative security of locations being selected for the storage of newly acquired strategic materials and in identifying unsafe locations which should receive priority consideration in the disposal of existing inventories in excess of objectives. Another result of the study thus far is the identification of moderately vulnerable storage sites which may be continued in use provided their security is hardened. Continuing study is pointed toward improving the national level of preattack security for all materials.

GSA began its training courses in radiological safety procedures. These courses will be extended to all GSA depots responsible for the storage and handling of stockpile materials.

Storage Arrangements and Activity

Strategic and critical materials were stored at 215 locations on June 30, 1960, as follows:

Type of facility	As of 6/30/60	Change in last 6 months
Military depots	62	-1
GSA depots	20	+2
Other Government-owned sites	8	+1
Industrial plantsites	39	0
Leased commercial sites	13	0
Commercial warehouses	72	-3
Port storage sites	1	+1
Total	215	0

Approximately 2.4 million tons of strategic materials were received during this period. Of this total, 1% was materials for the strategic stockpile, 18% for DPA inventories, and 81% for CCC inventories. About 8,000 inspections were made of materials received under the various programs.

On June 30, 1960, Government inventories of specification-grade Group I stockpile materials totaled about 38 million tons of materials with over 26 million of this being the strategic stockpile.

Two former Department of Defense depots, at which large quantities of stockpile materials are stored, were transferred to GSA during the period. Negotiations were completed for the transfer of two additional DoD facilities, with full operations to be assumed by GSA on July 1, 1960.

Stockpile Maintenance

During the six months' period, 128 new preservation and maintenance projects were initiated and 143 projects previously authorized were completed. As of June 30, 209 authorized projects were outstanding. These include such qualitative maintenance projects as repackaging from substandard containers, rehabilitation of containers, protection of ore piles from the elements, site preparation, repairs and maintenance of storage facilities, marking and identification of materials, and improvements of fire protection facilities.

Physical Inventorying

Inventory taking was completed at 1 GSA Depot and 16 military depots. Inventory action at the remaining 5 depots will be substantially completed by September 30, 1960. Funds covering contractual work for re-storing materials at these remaining depots were obligated from fiscal 1960 appropriations.

Notes on Strategic and Critical Materials

AGAR

During the six months' period 17,500 pounds of agar was sold from the stockpile for $9,140. An additional lot is scheduled for sale October 1 and the final lot will be offered six months thereafter.

ALUMINA

As a result of the first invitation to bid about 1,000 tons of obsolescent calcined alumina was sold. Acceptable offers from a second invitation to bid were received on 2,400 tons of the remaining 5,000 tons available for disposal from the stockpile. The remaining 2,600 tons, on which the prices offered were too low, will be re-advertised.

ALUMINUM

During the period January-June 1960, 14,481 short tons of primary aluminum was put to the Government under the Defense Production Act aluminum expansion program.

BERYLLIUM

As part of the national search for beryllium deposits, plans were made to use two mobile laboratories--one containing a spectroscope and the other a nuclear device--for rapidly testing rock samples in the field for beryllium. Some encouraging flotation tests were made in the Bureau of Mines' beryl-flotation test plant at Kings Mountain, N. C. Feed for the mill contained about 0.4 percent beryl.

Analyses and production tests were made for GSA on a bertrandite-beryl type of beryllium ore recently discovered in Colorado. Reports show that the ore is amenable to extraction with recovery equal to that of beryl ore of the same grade.

Beryl ore purchases under the domestic purchase program amounted to only 105 short tons, compared to 173 short tons for the first six months of 1959. Based on the current rate of deliveries, the program will continue through the termination date of June 30, 1962.

BRISTLES, HOG

One auction was held during the period, at which a total of 492,818 pounds was sold with proceeds amounting to $4,582,300. Cumulative sales of hog bristles from the beginning of disposal in 1956 now total 3,392,500 pounds, leaving only 128,000 pounds remaining for disposal. Total sales under the program as of June 30 amounted to $21,600,000 all of which has been or will be deposited into Miscellaneous Receipts of the Treasury.

CADMIUM-MAGNESIUM

Sealed bids were requested by September 9 for the sale of 8,826,000 pounds of cadmium-magnesium bomb scrap. Considerable interest has been shown in this offering by requests for both large and small samples.

Invitations to bid have been drafted for the initial sealed bid sale of about 902,460 pounds of magnesium incendiary bomb scrap. This offering will be the first of the 6,150,460 pounds authorized for disposal.

The Bureau of Mines successfully developed a continuous process utilizing a fluid bed reactor for extracting cadmium from zinc concentrates.

COCONUT OIL

Sales commitments were made for the disposal of 27,853,560 pounds of coconut oil, with proceeds amounting to $4,634,304.

COLUMBIUM-TANTALUM

Cooperative research between the Bureau of Mines and a private company resulted in development of a successful method for direct chlorination of euxenite ores to separate columbium and tantalum chlorides from the remainder of the ore.

COPPER

GSA has entered into an agreement with the Bureau of the Mint to supply the Mint with 10,000 short tons of cut copper cathodes, from the DPA inventory, at market price on date of delivery. This quantity is estimated to be approximately one year's requirement.

A segregation process, developed as a result of Bureau of Mines research, was used commercially for the first time to extract copper from a long-known deposit of refractory ore in Arizona. Pyrometallurgical research, by the Bureau of Mines, on copper smelter slags demonstrated the feasibility of recovering a high-iron-low-copper alloy suitable as a precipitant in the cementation process.

CORDAGE FIBERS

Abaca. January-June rotation sales of abaca without replacement, under the provisions of the Independent Offices Appropriation Act of 1960, totaled 6,153,000 pounds. In addition 5,522,000 pounds were rotated with replacement. The proceeds from sales without replacement were approximately $1,797,000, which were or will be deposited into Miscellaneous Receipts of the Treas-

ury. During the entire fiscal year 1960, 15,553,000 pounds were sold without replacement and 10,522,000 pounds were rotated with replacement. Expenditures for purchases during the fiscal year were $3,347,000 while the sale proceeds were $7,721,000.

All remaining Government-owned Central American abaca cultivations, i.e., Guatemala and Costa Rica, were butcher-harvested and all remaining property was sold. An additional sum of $2,200,000 was returned to the Treasury during the reporting period, bringing to $5,700,000 the amount returned to date under the program. With completion of the audit and the return of remaining funds to the Treasury, all activity under the Abaca Production Act of 1950 will be terminated.

Sisal. January-June rotation purchases of sisal totaled 47,820,000 pounds at a cost of $5,691,000. During the entire fiscal year 1960, 59,520,000 pounds were purchased under rotation at a cost of $6,971,000. Rotation sales for the fiscal year covered 60,116,000 pounds with proceeds totaling $6,813,000.

CRYOLITE

GSA continued its efforts to dispose of synthetic cryolite acquired under the DPA expansion program. During the period, a contract was consummated with one aluminum producer for a quantity of 6,500 long tons, to be delivered over a two-year period. The producer also has an option to purchase an additional 1,000 tons during the same period. The price established is based on the present market price for imported material, adjusted to reflect the quality of the Government-owned material. A long-term contract for storage of the remaining material was entered into at much lower cost than had been in effect previously. GSA, however, will continue its search for buyers of this material.

DIAMONDS

At an auction conducted by the Bureau of Customs 8,412 carats of cut and polished gem-quality diamonds were sold for a total return of $1,061,515. Considerable interest was expressed and over 200 bidders participated. Approximately 47,049 carats of rough cuttable gem-quality diamonds will be auctioned by Customs early in fiscal year 1961.

FEATHERS AND DOWN

A plan for disposal of approximately 1,930,000 pounds of surplus waterfowl feathers and down from the strategic stockpile was published in the Federal Register on June 9. In view of the current limited commercial market for this commodity the disposal plan provides for channeling the maximum possible quantity into direct Government uses. Accordingly, arrangements have been worked out with the Army Quartermaster General, Veterans Administration and Federal Supply Services of GSA for the utilization of this material in meeting current pillow requirements of all military and civilian agencies of the Government and for military sleeping bags. Sales contracts were entered into with the above agencies for 1,180,500 pounds of feathers. These sales and an additional sale of 10,775 pounds of feathers and down by auction, were made under the provisions of the Independent Offices Appropriation Act of 1960, which plan permitted rotation without replacement of excess perishable material.

FLUORSPAR

In cooperation with the Mexican Government and under sponsorship of Department of the Interior's Office of Minerals Mobilization, a Geological Survey geologist recently visited the principal fluorspar deposits in Mexico. The on-site geologic investigation indicated that the average grade of ore in the Mexican deposits exceeds that of the United States reserves, but the range in grade is similar in the two countries. The high quality of metallurgical-grade fluorspar shipped from some Mexican deposits is attributed to selective mining and repeated hand-picking and sorting in the mines and mills.

GRAPHITE

GSA has been authorized to dispose of 2,647 short tons of nonspecification graphite from the stockpile. Notice of the intent to dispose of this quantity was published in the Federal Register on March 16, and steps will be taken to sell the material after the six months' waiting period has expired. During the past six months 533 short tons of graphite, acquired under the DPA expansion program, was sold.

GUAYULE SEEDS

Notice for disposal of 17,426 pounds of guayule seeds was published in the Federal Register on February 12, 1960. Sale will be initiated at the end of the six months' waiting period.

HYOSCINE

Of the total 4,070 ounces authorized thus far for sale, 1,012 ounces of hyoscine was sold during the period January-June. Pursuant to provisions of the disposal plan, another offer will be made in January 1961, and the balance will be offered at the rate of about 1,000 ounces every 9 months.

JEWEL BEARINGS

The Turtle Mountain Plant, which is now being operated by a contractor with GSA as a part of the National Industrial Reserve, continues to produce jewel bearings for the strategic stockpile in accordance with the OCDM purchase directive. The Department of Defense is implementing an OCDM policy whereby military instrument manufacturers will be required to obtain their jewel bearings used in such instruments from the Turtle Mountain Plant.

Additional production workload that might be generated by such orders would provide the facility with experience in production of the many types of instrument jewel bearings required in military instruments. Military standards for instrument jewel bearings have been established and bearings meeting these standards are being produced at the Turtle Mountain plant.

KYANITE-MULLITE

A plan for disposal of 7,326 tons of kyanite-mullite was published in the Federal Register on May 7. Sale action will be undertaken when the required six months' waiting period has expired.

MICA

All contracts entered into under the DPA foreign mica purchase program were terminated by June 30, 1960. Seven of the foreign producers who did not deliver maximum quantities under the DPA contracts agreed to barter contracts, as did one strategic stockpile contractor. As a result, the Government's potential cash outlay was reduced by $1,287,000.

The domestic mica purchase program under the Defense Production Act will continue until June 30, 1962, or until 25,000 tons of hand-cobbed mica or its equivalent in trimmed mica has been acquired, whichever occurs first. Deliveries of mica under the domestic program thus far, amounting to a total of 20,810 tons as of June 30, 1960, indicate that the quantity limitation will be reached by the last half of calendar year 1961.

Two contracts remain in force under the synthetic mica research program—one with the Bureau of Mines and one with a non-Government contractor. Mica film satisfactory for use in capacitators has been developed. Mica sheet made to date has high electric and heat-resistant qualities, and activity is now centered on producing sheet sufficiently thick and flexible for tube spacers.

MOLYBDENUM (See TUNGSTEN)

NICKEL

GSA has entered into an agreement with the Bureau of the Mint to supply the Mint with 500,000 pounds of 1 inch x 1 inch nickel cathodes from the DPA inventory at market price on date of delivery. This quantity is estimated to be approximately one year's requirements.

OCDM authorized in January the sale from the DPA inventory of 19,000,000 pounds of electrolytic nickel. Of this quantity 4,650,000 pounds had been sold as of June 30.

PALM OIL

Notice of the intent to dispose of the entire palm oil stockpile of 37,609,878 pounds was published in the Federal Register of May 28, 1960. Of this quantity, 2,458,340 pounds of palm oil was sold, with a recovery of $178,230, prior to June 30 under the statutory authority for rotation without replacement of deteriorative materials. Inasmuch as this statutory authority expired on June 30, the balance will not be available for sale until six months from May 28.

PLATINUM GROUP METALS

Steps have been taken to analyze the 2,600 troy ounces of osmium, rhodium and ruthenium authorized for disposal. After obtaining this information, the osmium and ruthenium and part of the rhodium will be offered for sale on a sealed bid basis. The balance of the rhodium will be offered for sale on a monthly basis during succeeding months so as not to disturb the market.

POPPY SEEDS

Notice of the intent to dispose of 51,646 pounds of opium poppy seeds was published in the Federal Register of February 12, 1960.

PYRETHRUM

During the report period, 138,633 pounds of surplus pyrethrum was disposed of for $1,074,406. Of the approximately 207,800 pounds authorized for disposal, a total of 204,633 pounds has been sold. Sales contracts for the remaining quantity were in process at the end of the reporting period.

QUARTZ CRYSTALS

GSA has completed its cataloguing of a quantity of nonspecification quartz crystal, wafers, blanks and slabs, disposal of which was authorized in the first half of FY 1960. The material is now being prepared for display and for inspection by prospective buyers. Sealed bids are to be requested.

RUBBER

Of the 53,729 long tons disposed of during the last six months 42,747 long tons were rotated without replacement under the 1960 Appropriation Act. The balance of 10,982 long tons was sold under the disposal plan which the Congress approved on May 4. On June 23 a pricing formula for the long-range sale of additional surplus crude natural rubber from the stockpile was published. The formula provides that GSA will grant an age allowance of 3/8¢ per pound. It also reserves the right to deliver a higher grade, in lieu of a lower grade contracted for, whenever it would be to the interests of the Government.

RUTILE

During the reporting period, two contracts for rutile were converted to barter transactions, resulting in a net reduction of dollar expenditures under the DPA Revolving Fund.

SHELLAC

During the period January-June, 628,222 pounds of shellac was rotated.

SILK WASTE

In June 1960, 500,000 pounds of silk waste was offered to the trade on a sealed bid basis as rotation without replacement under provisions of the Independent Offices Appropriation Act of 1960. Bids covering 181,500 pounds with proceeds of $63,300 were accepted. All other offers were rejected because of low prices. Silk waste was removed from the List of Strategic and Critical Materials for Stockpiling.

TALC

Notice of proposed disposal of 6,285 short tons of ground steatite talc from the stockpile appeared in the Federal Register on April 15. Sale action will be initiated at the expiration of the waiting period in October.

THORIUM-BEARING MATERIALS

GSA continued during the period to attempt to dispose of rare earths and thorium fractions. However, only a small quantity of rare earths was sold to industry, for pilot production tests. Several companies have expressed interest in the rare earths but have made no concrete offers. Bids on the thorium fractions were rejected as not responsive.

TIN

Approximately 344 long tons of tin alloy (copan) was sold from the DPA inventory on a sealed bid basis. Sealed bids have been requested on the remaining 193 long tons.

TITANIUM

After requesting sealed bids on three different occasions, GSA in June 1960 sold on a negotiated basis 35,073 pounds of titanium sponge, 170 to 220 Brinell hardness, from the DPA inventory.

The Bureau of Mines, under contract with GSA, completed its laboratory and pilot plant work to investigate the feasibility of the Bureau's fused salt process for electrolytic refining of titanium scrap. A 10,000 ampere cell was constructed and operated successfully. The technical feasibility of the process was established and the data developed indicate good possibilities for commercial application.

The private corporation contract to develop an explosion-proof, skull-type melting furnace for the melting of titanium scrap and sponge was successfully concluded. The safety feature of this helium-cooled furnace was demonstrated during the pilot runs. A number of ingots up to 500 pounds were produced and the entire furnace operation was standardized to give reproducible results. This type furnace could be used for melting other refractory metals.

TUNGSTEN AND MOLYBDENUM

Bureau of Mines work on processing of tungsten minerals resulted in the development of an electrowinning process whereby both metallic tungsten and metallic molybdenum were produced directly from molybdenum-bearing scheelite.

ZINC

Approximately 165,222 pounds of zinc oxide pellets were sold on a negotiated basis in June after unsuccessful attempts to sell on a sealed bid basis.

ZIRCONIUM ORES

Negotiations with processors of zirconium ores resulted in the sale of approximately 850 short tons of zircon concentrate and zircon-bearing materials for production test runs. The purchaser has reported that the processing of 250 tons from the Blue Grass Ordnance Depot yielded satisfactory zirconium refractories.

Appendix A

FINANCIAL SUMMARY OF STOCKPILE OPERATIONS AS OF JUNE 30, 1960

TABLE 1 STATUS OF OBLIGATIONAL OPERATIONS

Under PL 117 and PL 520 for The National Stockpile

AUTHORITY	APPROPRIATED FUNDS a/	AUTHORIZATIONS FOR MAKING ADVANCE CONTRACTS b/	AUTHORIZATIONS FOR LIQUIDATING OUTSTANDING ADVANCE CONTRACTS c/	TOTAL OBLIGATIONAL AUTHORITY (CUMULATIVE) d/
Under PL 117 - 76th Congress				
PL 361 - 76th Congress, August 9, 1939	$ 10,000,000	$	$	$ 10,000,000
PL 442 - 76th Congress, March 25, 1940	12,500,000			22,500,000
PL 667 - 76th Congress, June 26, 1940	47,500,000			70,000,000 e/
Under PL 520 - 79th Congress				
PL 663 - 79th Congress, August 8, 1946	100,000,000	-	-	100,000,000
PL 271 - 80th Congress, July 30, 1947	100,000,000	75,000,000	-	275,000,000
PL 785 - 80th Congress, June 25, 1948	225,000,000	300,000,000	-	800,000,000
PL 785 - 80th Congress, June 25, 1948	75,000,000	-	75,000,000	800,000,000
PL 119 - 81st Congress, June 23, 1949	40,000,000	270,000,000	-	1,110,000,000
PL 150 - 81st Congress, June 30, 1949	275,000,000	250,000,000	-	1,635,000,000
PL 150 - 81st Congress, June 30, 1949	250,000,000	-	250,000,000	1,635,000,000
PL 434 - 81st Congress, October 29, 1949	-	-	100,000,000 f/	1,535,000,000
PL 759 - 81st Congress, September 6, 1950	365,000,000	-	240,000,000	1,660,000,000
PL 759 - 81st Congress, September 6, 1950	240,000,000	125,000,000	-	2,025,000,000
PL 843 - 81st Congress, September 27, 1950	573,232,449 g/	-	-	2,598,232,449
PL 911 - 81st Congress, January 6, 1951	1,834,911,000	-	-	4,433,143,449
PL 253 - 82nd Congress, November 1, 1951	590,216,500	-	-	5,023,359,949
PL 253 - 82nd Congress, November 1, 1951	200,000,000	-	200,000,000	5,023,359,949
PL 455 - 82nd Congress, July 25, 1952	203,979,000	-	70,000,000	5,157,338,949
PL 176 - 83rd Congress, July 31, 1953	-	-	30,000,000	5,127,338,949
PL 428 - 83rd Congress, June 24, 1954	-	-	27,600,000	5,099,738,949
PL 663 - 83rd Congress, August 26, 1954	379,952,000 h/	-	-	5,479,690,949
PL 112 - 84th Congress, June 30, 1955	321,721,000 i/	-	-	5,801,411,949
PL 112 - 84th Congress, June 30, 1955	27,400,000	-	27,400,000	5,801,411,949
PL 844 - 85th Congress, August 28, 1958	3,000,000	-	-	5,804,411,949
Rescinded by PL 255 - 86th Congress, September 14,1959	-58,370,923 j/	-	-	5,746,041,026
Total PL 520	5,746,041,026 k/	1,020,000,000	1,020,000,000	5,746,041,026
Total PL 117 and PL 520	5,816,041,026 k/	1,020,000,000	1,020,000,000	5,816,041,026

a/ Congressional appropriations of funds for stockpiling purposes.
b/ Congressional appropriations of contracting authority for stockpiling purposes in advance of appropriation of funds.
c/ Congressional authorization to liquidate outstanding obligations incurred under previously granted advance contract authority
d/ Cumulative total of appropriated funds and advance contract authorization, less authorization to liquidate outstanding advance contracts.
e/ Excludes $8,845,792 received from sale of stockpile materials for wartime consumption. Receipts were returned to Treasury, February 1948
f/ Cancellation of previously authorized authority to make contracts.
g/ Excludes $25,404,921 transferred to operating expenses for rehabilitation of Government-owned material producing plants.
h/ Excludes $48,000 transferred to Transportation and Public Utilities Service, GSA.
i/ Excludes $430,000 transferred to Transportation and Public Utilities Service, GSA and $199,349,000 transferred to General Fund Receipts on June 27, 1956 - PL 623 - 84th Congress
j/ As of June 30, 1959 this amount included cash of $52,350,792 and receivables of $6,020,131.
k/ Excludes receipts from rotational sales.

SOURCE GENERAL SERVICES ADMINISTRATION

TABLE 2 TOTAL OBLIGATIONS AND EXPENDITURES OF STOCKPILING FUNDS

Under PL 117 and PL 520 for The National Stockpile

CUMULATIVE AND BY FISCAL PERIOD, THROUGH JUNE 30, 1960

FISCAL PERIOD	Obligations Incurred A/		Expenditures B/	
	Net Change By Fiscal Period	Cumulative As of End of Period	By Fiscal Period	Cumulative As of End of Period
Prior to Fiscal Year 1948	$ 123,871,685	$ 123,871,685	$ 66,330,731	$ 66,330,731
Fiscal Year 1948	252,901,411	376,773,096	82,907,575	149,238,306
Fiscal Year 1949	459,766,881	836,539,977	304,486,177	453,724,483
Fiscal Year 1950	680,427,821	1,516,967,798	440,834,970	894,559,453
Fiscal Year 1951	2,075,317,099	3,592,284,897	655,537,199	1,550,096,652
Fiscal Year 1952	948,117,547	4,540,402,444	844,683,459	2,394,780,111
Fiscal Year 1953	252,375,163	4,792,777,607	906,158,850	3,300,938,961
Fiscal Year 1954	116,586,681	4,909,364,288	644,760,321	3,945,699,282
Fiscal Year 1955	321,799,833	5,231,164,121	801,310,094	4,747,009,376
Fiscal Year 1956 C/	251,692,667	5,482,856,788	382,011,786 C/	5,129,021,162 C/
Fiscal Year 1957	190,000,109	5,672,856,897	354,576,558	5,483,597,720
Fiscal Year 1958	54,473,250	5,727,330,147	173,753,997	5,657,351,717
Fiscal Year 1959	38,710,879	5,766,041,026	65,260,098	5,722,611,815
Fiscal Year 1960	19,859,290	5,785,900,316	49,227,142	5,771,838,957

A/ Figures are the sum of obligations incurred under PL 520, 79th Congress and PL 117, 76th Congress. Final obligations under PL 117, 76th Congress were incurred in Fiscal Year 1949.

B/ Figures are the sum of expenditures under PL 520, 79th Congress and PL 117, 76th Congress. Final expenditures under PL 117, 76th Congress were made in Fiscal Year 1951.

C/ 1956 and subsequent fiscal periods and cumulative expenditures are reported on an accrual basis.

SOURCE: GENERAL SERVICES ADMINISTRATION

Table 3 Expenditures of Stockpiling Funds, By Type

for the National Stockpile

Cumulative and for Fiscal Year 1960

Type of Expenditure	Cumulative Through December 31, 1959 a/	Six Months Ended June 30, 1960	Cumulative Through June 30, 1960 a/
Expenditures			
Gross Total	$6,291,772,674	$21,284,638	$6,313,057,312
Less: Adjustments for Receipts from Rotation Sales and Reimbursements	541,218,355	0	541,218,355
Net Total	5,750,554,319	21,284,638	5,771,838,957
Material Acquisition Costs, Total	5,423,830,485	2,849,796	5,426,680,281
Stockpile Maintenance Costs, Total	286,131,607	16,173,196	302,304,803
Facility Construction	43,772,457	0	43,772,457
Storage and Handling Costs	174,265,874	8,437,230	182,703,104
Net Rotation Costs	68,093,276	7,735,966	75,829,242
Administrative Costs	40,128,833	1,516,064	41,644,897
Operations, Machine Tool Program	463,394	745,582	1,208,976

a/ Cumulative figures are the total of expenditures under PL 117, 76th Congress and PL 520, 79th Congress. Expenditures under PL 117, 76th Congress totaled $70,000,000, of which $55,625,237 was for materials acquisition costs and $14,374,763 was for other costs. Final expenditures under PL 117 were made in FY 1951.

SOURCE: GENERAL SERVICES ADMINISTRATION

Appendix B

CHANGES IN STOCKPILE PURCHASE SPECIFICATIONS JANUARY-JUNE 1960

Number	Item	Date of revision
P-7-R	Bismuth	March 29
P-19-R	Diamond--Industrial	June 22
P-57a-R2	Ferrotungsten	May 13
P-27-R	Kyanite-Mullite	February 29
P-49-R	Rutile	May 19
P-93-R1	Tungsten Carbide Powder	May 13
P-89-R1	Tungsten Metal Powder (Hydrogen-Reduced)	May 13

Appendix C

REPORTS ISSUED BY THE DEPARTMENT OF THE INTERIOR JANUARY-JUNE 1960

BUREAU OF MINES

Bulletins

585 Mineral Facts and Problems, 1960 edition.

Reports of Investigations

5515 Experimental Electric Furnace Smelting of Siliceous Manganiferous Materials.
5516 Tungsten Deposits of Yuma, Maricopa, Pinal, and Graham Counties, Arizona.
5517 Tungsten Deposits of New Mexico.
5529 Heats of Combustion and Formation of Molybdenum Subnitride and Chromium Subnitride.
5530 Manganese Deposits of the Olympic Peninsula, Washington.
5543 An Electrolytic Method for Separating Nickel and Cobalt.
5544 Extraction of Yttrium and Rare-Earth Elements from Arizona Euxenite Concentrate.
5546 Effect of Common Impurities on Hardness of Electrolytically Refined Titanium Metal.
5549 Metallurgical Laboratory Data on Reduction and Refining of Ceric Fluoride to Cerium Ingot.
5551 Electron Micrographs of Asbestiform Minerals.
5552 Tungsten Resources of Montana: Deposite of the Mount Torrey Batholith, Beaverhead County.
5554 Electrowinning Tungsten and Associated Molybdenum from Scheelite.
5555 Molybdenum Casting Development.
5557 Chemical Analysis of a Calcined Kyanite from Kenya, East Africa.
5561 Geologic Factors Related to Block Caving at San Manuel Copper Mine, Pinal City, Arizona.
5564 Beneficiating a Complex Sulfide-Oxide Lead-Zinc Ore from Missouri.
5565 High Temperature Heat Contents and Entropies of Aluminum and Ferrites of Lithium and Sodium, and of Lithium Titanate.
5566 Experimental Treatment of Base-Metal Ores from California and Nevada.
5567 Electronegatives of the Rare-Earth Elements.
5570 Liquid-Liquid Extraction of Rare-Earth Elements.
5571 Low-Temperature Heat Capacities and Entropies at 298.15°K. of the Zirconates of Calcium, Strontium, and Barium.
5575 Experimental Smelting of Aluminum Silicates to Produce Aluminum-Silicon Alloys.
5576 Utilization Studies on Chromite From Seiad Creek, California.
5577 Examination of Ilmenite-Bearing Sands in Otter Creek Valley, Kiowa and Tillman Counties, Oklahoma.
5579 Reconnaissance of California Manganese Deposits.
5581 Electrorefining Beryllium, Prelim. Studies.
5586 Effect of Antimony on Tensile Properties of Titanium.
5588 Preparation of High-Purity Yttrium by Metallic Reduction of Yttrium Trichloride.
5589 High-Purity Chromium by Electrolysis.
5591 Properties of Titanium-Vanadium-Cobalt Alloys.
5596 Reducing Titanium Tetrachloride With High-Surface Sodium.
5598 Flotation of Low-Grade Mercury Ores.
5599 Technology of Bastnasite.
5600 Thermodynamic Properties of Manganese and Its Components.
5602 Separation of Chloride Vapors During Ilmenite Chlorination.
5604 Properties of Titanium-Vanadium-Zirconium Alloys.
5612 Tungsten Resources of Montana: Deposits of the Philipsburg Batholith, Granite and Deer Lodge Counties.
5620 Field Test for Beryllium Minerals: The Morin Flourescence Method.

Information Circulars

7908 Underground Mining Methods and Costs at Three Salt Wash Uranium Mines of Climax Uranium Co.
7910 Bibliography on Semiconductors for Thermoelectric Use.
7922 Uranium-Mining Practices and Costs at Ten Salt Wash Lease Operations of Union Carbide Nuclear Co.
7929 Open-Pit Copper Mining Methods and Costs at the Bagdad Mine, Bagdad Copper Corp., Yavapai County, Arizona.
7936 Tungsten Mining and Milling in Boulder County, Colorado.
7938 Open-Pit Copper Mining Methods at New Cornelia Branch, Phelps Dodge Corp., Pima County, Arizona.
7944 Exploratory Drilling Practices and Costs at Western Uranium Deposits.
7945 Mining Methods and Costs, Black Rock Tungsten Mine, Wah Chang Mining Corp., Mono County, California.
7946 Field Test for Beryllium.
7953 Bibliography on Metallurgy of High-Purity Tungsten, January 1911 Through February 1959.

U. S. GEOLOGICAL SURVEY

Professional Papers

309 The geology of the Upper Mississippi Valley zinc-lead district.
312 Geology and quicksilver deposits, Terlingua district, Texas.

Bulletins

1058-E Geology and ore deposits of northwestern Chichagof Island, Alaska. (Copper, iron, nickel, tungsten, and gold)
1074-F Geology and uranium occurrences in the Miller Hill area, Carbon County, Wyoming. (Lead, barium, manganese, copper, nickel, molybdenum, and iron)
1087-D Geology and uranium deposits of Monument Valley, San Juan County, Utah. (Uranium, vanadium)
1112-A Selenium in some epithermal deposits of antimony, mercury, and silver and gold.
1112-C Some geologic features of the Pima mining district, Pima County, Arizona. (Copper, lead, and zinc)

Circulars

420 Occurrence of strontium in natural water.
427 Field instruments for the determination of beryllium.

Reports Placed on Open File for Inspection

Geology and ore deposits of the Klondike Ridge area, Colorado. (Uranium, vanadium, copper, and manganese)

Maps

MF-230 New geologic maps of famous Utah silver-lead-zinc district-East Tintic. Scale 1:9,600. (Silver, lead, zinc, gold, copper)

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